T18D09 – 18.4 Titration Curves Lab Activity

***Note:** This lab is not quantitative in nature and the directions do not require your collection of data to be as precise as the instruments chosen allow. This is intentional so that the lab activity can be completed within one class period. You will not need to use uncertainty and this lab will not be graded on an IB scale.*

Task: With a partner, use a pH probe, Vernier, and Logger Pro to

- Construct four titration graphs:
  - Strong Acid by Strong Base
  - Strong Acid by Weak Base
  - Weak Acid by Strong Base
  - Weak Acid by Weak Base
- In an earlenmeyer flask, add 15mL of your acid and dilute to roughly 50mL.
- Set up Vernier to record "events by entry" option located in /experiment (use volume, mL)
- Choose an appropriate indicator based on the combination of acid/base strength
- Titration:
  - Add the base in (roughly) 0.5-1.0 mL increments, about every 5-10 seconds
  - Note when the indicator changes colors (and note the color)
  - Continue until 30 mL have been added
  - Solutions may be disposed of in the waste bin when completed

Assignment:

- Individual write ups
- Add each of the four graphs into a single word doc (one page please), label for each
  - Equivalence point
    - Volume
    - pH
  - Starting and ending pH
  - Where on the titration curve the indicator changed colors (and between what colors)
    - justify your choice of indicator based on K_a or pK_a values
  - Buffer region
  - pK_a of the acid
  - pK_b of the base

Materials:
Acids: 1.0M HCl, 1.0M CH_3COOH
Bases: 1.0M NaOH, 1.0M NH_3
Indicators: Methyl Red, Methyl Orange, Bromothymol Blue, Bromophenol Blue, Thymol Red
Apparatus: Ring stand, thermometer clamp, buret clamp, 50.00 ± 0.05mL buret, earlenmeyer flask, funnel, vernier, pH probe, magnetic stir plate, stir bar